Remarks

These Remarks are in reply to the Office Action mailed April 11, 2002.

Claims 1-30 and 47-50 were pending in the Application prior to the outstanding Office Action. In the Office Action, the Examiner rejected claims 1-30 and 47-50 under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 5,675,799 to Doktor in view of U.S. Patent No. 6,088,659 to Kelley. The present Response adds new claims 83 and 84, leaving for the Examiner's present consideration claims 1-30, 47-50, 83 and 84. No amendments have been made to claims 1-30 or 47-50. New claim 83 combines features of claims 1 and 10, and incorporates the data model language of claims 31 and 32 to further define an embodiment of the invention. New claim 84 combines features of claims 48 and 49.

Reconsideration and withdrawal of the rejections is respectfully requested.

I.   Brief Summary of Kelly

Kelley describes an automated meter reading system, which is used to store amongst other things billing data, and meter types and rates. In column 53 lines 6-11 of Kelley the following is disclosed:

> The Bitemporal Conceptual Data Model is an extension of the relational data model which allows for two independent, orthogonal time periods to be associated with each tuple (row) in a relation (table). It accomplishes this by using the timestamp data type to append two time periods to each tuple: Valid time and Transaction time.

This clearly indicates that the timestamps are attached to the tuple or row of the relational database. The data stored in the tuple is merely transaction data. Therefore, the validity periods are attached to transaction data.

II.   Brief Summary of Doktor

Doktor merely discloses a data processing system and method for maintaining cardinality in a

relational database. Within Doktor, in column 3 lines 60-63, the following is disclosed, as indicated by the

Examiner:

> The address pointers are used to create so-called "threaded list" organizations of data
> wherein logical links between a first informational "object" (first piece of real data) and
> a second informational "object" (second piece of real data) are established by a chain of
> direct or indirect address pointers.

This merely shows the disclosure of the use of threaded lists. The threaded lists are used to decide

on which way to navigate through the database. A threaded list used in a relational database would involve

having to move from one entity to another, which makes for inefficiency.

III.   Discussion of Differences Between Claimed Invention and Applied References

A.   Claims 1-30

Claim 1 in the present application claims a data processing system, which includes a storage device

that stores:

a)   multiple operation records (i.e., transaction data, *see* Applicants' spec. page 13, lines 8-14), which

store data relating to one or more historical operation involving at least one entity, each said operation record

comprising data recording the operation, and data defining a date associated with the operation; and

b)   multiple entity records (i.e., reference data, see Applicants' spec. page 13, lines 3-7), which store

data indicating relationships between the entities, and each relationship being associated with a historical

period of validity.

Thus, the invention of claim 1 allows for the relationships of entities to become time variant, i.e. the

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validity period is applied to the entity records relationship data, and not to the operation records (transaction data).

Kelley does not allow for entity records to be time variant. Rather, Kelley teaches that operation records (transaction data) are associated with validity periods, i.e., data relating to one or more historical operations involving at least one entity; in other words data representing business activities over time (*see* the examples shown in columns 54-56 of Kelley). Transaction data is data that represents business activities (*see* Applicants' specification, page 11, line 19). In other words, transaction data is made of data items relating to business transactions. A transaction will have a number of values (data items) associated with it, which can be related to a set of business entities. Each transaction is typically an operation involving one or more entities, i.e., operation records as in claim 1 (*see* Applicants' specification, page 13, lines 8-14). Kelley's linking a meter type with meter rate over a certain period of validity is merely a business activity with a validity period attached to it, i.e., transaction data.

In contrast, in claim 1 the validity period is associated with the relationships between entities, and data is stored in multiple entity records that indicate the relationships between these entities. The entities are reference data elements that make up the reference data. The reference data depicts the business organisation, as opposed to the business activities. This allows for business organisations to be stored continuously over time, even when relationships in the organisation change. Therefore, historical data can be retrieved from a historically different organisation to the current one, and new organisational structures can be added so the organisation may be updated without the need for reformatting the database structures, as would be necessary in Kelley (*see* Applicants' specification, page 6, line 19 to page 7, line 6).

Doktor or any other cited reference, taken alone or in combination, does not teach the deficiencies of Kelley. Accordingly, Applicants respectfully request that the 35 U.S.C. §103(a) rejection of claim 1 be withdrawn.

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Claims 2-30 depend from and add additional features to claim 1. Accordingly, Applicants assert that claims 2-30 are patentable for at least the reasons discussed above with regards to claim 1. Further, Applicants assert that these claims are also patentable for the unique and unobvious features that they add, some of which are discussed below.

Claim 3 claims a processor programmed to select a subset of operation records based on the historical periods of validity associated with the selected entities.

Claim 4 claims the selection of entity relationships that have periods of validity within which an analysis date lies.

Claim 7 claims the analysis of operation records in accordance with the relationships between entities that have associated historical periods of validity within which the date of that operation record lies.

Kelley, Doktor or any other cited reference does not disclose or suggest alone or in combination a selection of a subset of operation records based on historical periods of validity associated with selected entities. Kelley merely has periods of validity attached to transaction data, or, in the terminology of claim 1, operation records. Doktor does not disclose or suggest the use of historical periods of validity associated with entities. Indeed, Figure 7 and column 7, lines 50-52 of Doktor merely discloses a relational database storing two entity types.

Claim 9 claims the storing of an end or start date for a period of validity of an existing relationship between entities. Kelley, Doktor or any other cited reference does not disclose or suggest alone or in combination the use of periods of validity attached to entity relationships. In particular, Doktor, col 3 lines 36-42, merely discloses that prior art computerised databases require a restructuring every time a new category of information relationships or new type of inquiry is created. There is no disclosure of a period of validity for an existing relationship between entities, and none is suggested.

Claim 10 claims entity records containing data representing their historical period of validity, and

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also association records for each past or present relationship between pairs of entities. Kelley, Doktor or any other cited reference does not disclose or suggest alone or in combination the use of periods of validity attached to entity relationships. Doktor, col 6, lines 57-69, merely discloses the storage in memory of an entity definition table, to store an allowed entity type and one other table to store instances of the allowed entity type.

Claim 5 claims the offering of the current date as a date option, to permit the analysis of operation records anterior to the current date as if the current relationship between entities had previously existed. The offering of a current date as a date option to permit this type of analysis is not disclosed or suggested in Kelley, Doktor or any other cited reference taken alone or in combination. In Doktor, col 5 lines 33-49, a description of pointer use is merely given, and there is no disclosure of the use of dates.

Claim 6 claims the offering of the anterior date as a date option, to permit the analysis of operation records posterior to the current date as if a historical relationship between entities still persisted. The offering of an anterior date as a date option to permit this type of analysis is not disclosed or suggested in Kelley, Doktor or any other cited reference taken alone or in combination. Also, there is not disclosure in any cited reference of using historical relationships between entities.

Claim 11 claims a system wherein entity records comprise a hierarchical structure, in which at least a first entity record relates to a specific entity, and a second to a more generic entity encompassing the specific entity, the entity records including link data linking the first and second entity records whereby to allow the processor to traverse the hierarchy. Within the present application entity records (reference data and associated relational validity periods) are formed into a hierarchical structure. The details of multiple operational records (transaction data) may be analysed in hierarchies of entities. This analysis is based on either the data associated with the operation or any arbitrary data. Further, in the present application the processor is able to determine from the entity records whether a higher hierarchical level is required in order to obtain all the necessary operation records required to generate the output data requested.

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Kelley, Doktor or any other cited reference does not disclose or suggest alone or in combination the use of these features. In particular, Doktor merely suggests the use of threaded lists in col 3 lines 60-63, and pointers in col 4, lines 1-6.

Claim 15 claims a system wherein a processor is programmed to determine a hierarchically higher entity to repeat a determination, and if operation records relate to the hierarchically higher entity throughout a whole historical period of validity, to use the hierarchically higher entity instead of a selected entity in selecting a subset of the operation records. Kelley, Doktor or any other cited reference does not disclose or suggest alone or in combination the use of the feature of moving hierarchically up and down in a database based on either a historical period of validity or whether operation records relate to entities of a dimension or not. In Doktor, col 5, lines 35-40 the use of pointers is merely disclosed.

B.   Claim 47

Claim 47 claims a data storage device storing a data structure comprising:

a)   multiple operation records (transaction data) each storing data relating to one or more historical operation involving at least one entity, each operation record comprising data recording the operation, and data defining a date associated with the operation; and

b)   multiple entity records (reference data) storing data indicating relationships between the entities, and each relationship being associated with a historical period of validity.

For the same reason discussed above with regards to claim 1, Kelley, Doktor or any other cited reference does not disclose or suggest alone or in combination the use of these features.

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C. Claim 48

Claim **48** claims a data processing system including the feature of entity records that comprise a hierarchical structure as claimed in claim 11 above. Accordingly, Applicants assert that claim 48 is patentable for at least the same reasons discussed above with respect to claim 11.

D. Claims 49-50

Claim **49** claims a system wherein a processor is programmed to determine a hierarchically higher entity to repeat a determination, and if operation records do not relate to entities of the dimension to which the operation records relate, to use the hierarchically higher entity instead of a selected entity in selecting a subset of the operation records. These features are similar to those claimed in claim 15. Accordingly, Applicants assert that claim 49, and its dependent claim 50, is patentable for at least the same reasons discussed above with respect to claim 15.

E. Claim 83

Claim **83** claims a data processing system comprising a data storage device and a processor programmed to read data from, and write data to, said storage device, in which said storage device stores a time variant data model to which data in a data structure conforms, the data model generated by the processor and representing the relationships between a plurality of classes of entities, said storage device further storing:

a)   multiple operation records each storing data relating to one or more historical operations involving at least one said entity conforming to one of said classes, each said operation record comprising data recording the operation, and data defining a date associated with the operation; and

b)   multiple entity records and association records which conform to the data model, each of the multiple entity records comprising an entity record for each said entity conforming to one of said classes, said

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association records storing data indicating past or present relationships between a pair of said entities, and each said entity record containing data associating each said relationship with a historical period of validity.

This shows that the data model is also stored alongside the entities and relationships, in the form of classes of entities and there associated relationships, the relationships having periods of validity attached, as supported by page 22 line 10 to page 23 line 6, page 30 lines 15-20, page 43 lines 16-18, page 69 lines 16-17 and page 72 lines 11-14 of Applicants' specification. Kelley, Doktor or any other cited reference does not disclose or suggest alone or in combination the use of these features.

F.   Claim 84

Claim 84 claims a data processing system comprising a data storage device and a processor programmed to read data from, and write data to, said storage device, in which said storage device stores multiple operation records each storing data relating to one or more historical operation involving at least one entity; and multiple entity records storing data indicating relationships between said entities, wherein the entity records comprise a hierarchical structure, in which at least a first entity record relates to a specific entity, and a second to a more generic entity encompassing said specific entity, said entity records including link data linking said first and second entity records whereby to allow said processor to traverse said hierarchy, said processor being arranged to generate output data by inputting instructions defining one or more selected entity dimensions across which said output data is to be distributed; and if all required said operation records do not relate to entities of the dimension to which the operation records relate, the processor is programmed to determine, from said entity records, a hierarchically higher level entity dimension and to repeat said determination and, in the event that all required said operation records relate to said hierarchically higher level, to use said hierarchically higher entity instead of said selected entity in selecting said subset of operation records.

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Kelley, Doktor or any other cited reference does not disclose or suggest alone or in combination the use of these features.

G.   Additional Comments

Even if the Examiner is of the mind to refute the above arguments, neither the Doktor reference nor the Kelley reference provides an enabling disclosure of the subject matter as claimed in the present application.

Applicants further point out that the criteria required to establish a *prima facie* case of obviousness includes, among other criteria, that: 1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; and 2) there must be a reasonable expectation of success. (*See* MPEP Section 2143.)   Applicants assert that there is no motivation to combine Doktor with Kelley, especially considering Kelley describes a system designed to store and extract meter reading data. Accordingly, Applicants assert that the rejections based on the combination of these two references are improper, and respectfully requests that they be withdrawn.
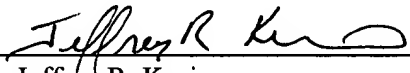
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IV. Conclusion

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowable. Reconsideration and allowance of all claims is, therefore, respectfully requested. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

Date: ___July 11, 2002___   By: _____*Jeffrey R Kurin*_____

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